

## CLAIMS:

1. An image output system comprising an image processing device that makes image data subjected to a preset series of image processing and an image  
5 output device that creates dots according to a result of the preset series of image processing to form an output image on an output medium,

said image processing device comprising:

a pixel group tone value specification module that specifies a pixel group  
tone value as a representative tone value of each pixel group, which is provided  
10 by collecting a preset number of plural pixels among a number of pixels constituting the image, according to image data of individual pixels in the pixel group;

a correlation map storage module that stores a correlation map correlating dot number data of each pixel group, which represents number of dots  
15 to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group; and

a dot number data supply module that refers to the stored correlation map to generate dot number data of each pixel group and supplies the generated  
20 dot number data of each pixel group to said image output device,

said image output device comprising:

a pixel position determination module that stores a priority order of dot-on pixels in one pixel group and determines positions of dot-on pixels in each pixel group based on the priority order of dot-on pixels and the supplied dot  
25 number data of the pixel group; and

a dot creation module that actually creates dots at the determined positions of dot-on pixels on the output medium.

2. An image output system in accordance with claim 1, wherein said  
30 image output device further comprises a priority order storage module that stores

multiple different priority orders of dot-on pixels in one pixel group,

said pixel position determination module receiving the supplied dot number data of each pixel group and selecting one priority order for the pixel group among the multiple different priority orders to determine the positions of dot-on pixels in the pixel group.

3. An image output system in accordance with either one of claims 1 and 2, wherein said image processing device further comprises a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the image and allocates the pixel group classification number to each pixel group, and

the correlation map stored in said correlation map storage module correlates dot number data of each pixel group to a combination of the pixel group classification number and the pixel group tone value of the pixel group.

4. An image output system in accordance with claim 3, wherein said classification number allocation module allocates the pixel group classification number to each pixel group, based on a relative position of the pixel group to a dither matrix, which includes multiple threshold values in a two-dimensional arrangement and is applied to the image,

said correlation map storage module generates the dot number data of each pixel group, which represents the number of dots to be created in the pixel group, by dither technique that applies the dither matrix to each pixel in the pixel group on the assumption that all the pixels in the pixel group have an identical pixel group tone value, and stores the generated dot number data in relation to a combination of the pixel group classification number and the pixel group tone value of the pixel group,

said priority order storage module divides the dither matrix into plural blocks according to the pixel group classification number of each pixel group and stores the multiple different priority orders of dot-on pixels, where each priority

order is set according to threshold values in one of the plural blocks and is allocated to one pixel group classification number, and

said pixel position determination module selects a priority order of dot-on pixels corresponding to a pixel group classification number allocated to an object pixel group as a target of pixel position determination and determines the positions of dot-on pixels.

5. An image processing device that makes image data subjected to a preset series of image processing and generates the processed image data as control data, which is supplied to an image output device to control creation of dots and form an output image,

said image processing device comprising:

a pixel group tone value specification module that specifies a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

a correlation map storage module that stores a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group; and

a dot number data supply module that refers to the stored correlation map to generate dot number data of each pixel group and supplies the generated dot number data of each pixel group to said image output device.

6. An image processing device in accordance with claim 5, said image processing device further comprising:

a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the output image and allocates the pixel group classification number to each pixel

group,

wherein the correlation map stored in said correlation map storage module correlates dot number data of each pixel group to a combination of the pixel group classification number and the pixel group tone value of the pixel group.

7. An image processing device in accordance with claim 6, wherein said classification number allocation module converts a resolution of the image data to make a pixel size identical with a size of each pixel group and allocates the pixel group classification number to each pixel with the converted resolution according to a relative position of the pixel in the output image, and

said pixel group tone value specification module specifies a tone value of the image data in each pixel with the converted resolution as the pixel group tone value of the pixel.

8. An image processing device in accordance with any one of claims 5 through 7, wherein said correlation map storage module stores dot number data of each pixel group, which represents a combination of numbers of multiple different types of dots having different expressing tone values to be created in the pixel group, in relation to a combination of the pixel group classification number and the pixel group tone value of the pixel group.

9. An image processing device in accordance with any one of claims 5 through 7, wherein said pixel group tone value specification module collects 4 pixels in a main scanning direction and either 2 pixels or 4 pixels in a sub-scanning direction to each pixel group and specifies the pixel group tone value of the pixel group.

10. An image output device that creates dots on an output medium according to image data to form an output image,

said image output device comprising:

a pixel group tone value specification module that specifies a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

a correlation map storage module that stores a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

a dot number data generation module that refers to the stored correlation map to generate dot number data of each pixel group;

a pixel position determination module that stores a priority order of dot-on pixels in one pixel group and determines positions of dot-on pixels in each pixel group based on the priority order of dot-on pixels and the supplied dot number data of the pixel group; and

a dot creation module that actually creates dots at the determined positions of dot-on pixels on the output medium.

11. An image output device in accordance with claim 10, said image output device further comprising:

a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the output image and allocates the pixel group classification number to each pixel group,

wherein the correlation map stored in said correlation map storage module correlates dot number data of each pixel group to a combination of the pixel group classification number and the pixel group tone value of the pixel group.

12. An image output method that makes image data subjected to a preset series of image processing and creates dots on an output medium according to the processed image data to form an output image, said image output method comprising:

5           a first step of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

10           a second step of storing a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

          a third step of referring to the stored correlation map to generate dot number data of each pixel group;

15           a fourth step of storing a priority order of dot-on pixels in one pixel group and determining positions of dot-on pixels in each pixel group based on the priority order of dot-on pixels and the supplied dot number data of the pixel group; and

20           a fifth step of actually creating dots at the determined positions of dot-on pixels on the output medium.

13. An image processing method that makes image data subjected to a preset series of image processing and generates the processed image data as control data, which is supplied to an image output device to control creation of  
25   dots and form an output image,

          said image processing method comprising:

30           a step (A) of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

a step (B) of storing a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group; and

5 a step (C) of referring to the stored correlation map to generate dot number data of each pixel group and supplying the generated dot number data of each pixel group to said image output device.

14. A program executed by a computer to actualize an image output  
10 method, which makes image data subjected to a preset series of image processing and creates dots on an output medium according to the processed image data to form an output image,

said program causing the computer to attain:

a first function of specifying a pixel group tone value as a representative  
15 tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

a second function of storing a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the  
20 pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

a third function of referring to the stored correlation map to generate dot number data of each pixel group;

a fourth function of storing a priority order of dot-on pixels in one pixel  
25 group and determining positions of dot-on pixels in each pixel group based on the priority order of dot-on pixels and the supplied dot number data of the pixel group; and

a fifth function of actually creating dots at the determined positions of dot-on pixels on the output medium.

15. A program executed by a computer to actualize an image processing method that makes image data subjected to a preset series of image processing and generates the processed image data as control data, which is supplied to an image output device to control creation of dots and form an output image,

5       said program causing the computer to attain:

      a function (A) of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural adjacent pixels, according to image data of individual pixels in the pixel group;

10       a function (B) of storing a correlation map correlating dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group; and

      a function (C) of referring to the stored correlation map to generate dot  
15       number data of each pixel group and supplying the generated dot number data of each pixel group to said image output device.

16. An image output system comprising an image processing device that makes image data subjected to a preset series of image processing and an image  
20       output device that creates dots according to a result of the preset series of image processing to form an output image on an output medium,

      said image processing device comprising:

      a dot number data generation module that divides a number of pixels constituting the image into multiple pixel groups, where each pixel group consists  
25       of a preset number of plural pixels, and generates dot number data of each pixel group, which represents number of dots to be created in each pixel group, according to the image data; and

      a dot number data supply module that supplies the generated dot number data of each pixel group to said image output device,

30       said image output device comprising:



an ordinal number acquisition module that obtains ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

a correlation map storage module that stores a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

a dot on-off state determination module that refers to the correlation map to read a dot on-off state corresponding to the received dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determines the dot on-off state in the pixel of the pixel group; and

a dot creation module that actually creates dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

17. An image output system in accordance with claim 16, wherein said image output device further comprises a priority order storage module that stores multiple different priority orders of dot-on pixels in one pixel group,

said ordinal number acquisition module obtaining the ordinal number of each pixel included in each pixel group, based on one priority order selected among the multiple different priority orders,

said dot on-off state determination module using the obtained ordinal number of each pixel included in each pixel group to determine the dot on-off state in the pixel of the pixel group.

18. An image output system in accordance with claim 17, wherein said dot number data generation module generates the dot number data of each pixel group, based on a dither matrix that correlates threshold values to individual pixels in a two-dimensional arrangement, and

said priority order storage module divides the dither matrix used for generation of the dot number data into multiple blocks corresponding to the multiple pixel groups, specifies an order of pixels in each pixel group based on a

magnitude relation of threshold values in a block corresponding to the pixel group, and stores the specified order of pixels as one of the multiple different priority orders of dot-on pixels.

5           19. An image output device that receives image data after a preset series of image processing and creates dots on an output medium according to the received image data to form an output image,

said image output device comprising:

10           a dot number data receiving module that receives dot number data of each pixel group, which represents number of pixels to be created in the pixel group, as the image data, where the pixel group is provided by collecting a preset number of plural pixels among a number of pixels constituting the image;

15           an ordinal number acquisition module that obtains ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

          a correlation map storage module that stores a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

20           a dot on-off state determination module that refers to the correlation map to read a dot on-off state corresponding to the received dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determines the dot on-off state in the pixel of the pixel group; and

          a dot creation module that actually creates dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

25           20. An image output device in accordance with claim 19, said image output device further comprising:

          a priority order storage module that stores multiple different priority orders of dot-on pixels in one pixel group,

30           wherein said ordinal number acquisition module obtains the ordinal

number of each pixel included in each pixel group, based on one priority order selected among the multiple different priority orders, and

said dot on-off state determination module uses the obtained ordinal number of each pixel included in each pixel group to determine the dot on-off state in the pixel of the pixel group.

21. An image output device in accordance with claim 19, wherein said dot number data receiving module receives the dot number data of each pixel group, which represents numbers of multiple different types of dots having different expressing tone values to be created in the pixel group,

said correlation map storage module stores the correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state including a dot type to be created in a pixel having the ordinal number,

said dot on-off state determination module determines the dot on-off state in each pixel included in each pixel group with regard to each of the multiple different types of dots, and

said dot creation module actually creates the multiple different types of dots on the output medium according to a determination result of the dot on-off state including the dot type to be created in the number of pixels.

22. An image output device in accordance with claim 19, wherein said dot number data receiving module receives the dot number data of each pixel group, which consists of 8 to 16 pixels in a preset positional relation.

23. An image processing output device that makes image data subjected to a preset series of image processing and creates dots on an output medium according to the processed image data to form an output image,

said image processing output device comprising:

a dot number data generation module that divides a number of pixels

constituting the image into multiple pixel groups, where each pixel group consists of a preset number of plural pixels, and generates dot number data of each pixel group, which represents number of dots to be created in each pixel group, according to the image data;

5            an ordinal number acquisition module that obtains ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

          a correlation map storage module that stores a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

10           a dot on-off state determination module that refers to the correlation map to read a dot on-off state corresponding to the generated dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determines the dot on-off state in the pixel of the pixel group; and

15           a dot creation module that actually creates dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

24. An image processing output method that makes image data subjected to a preset series of image processing and creates dots on an output medium according to the processed image data to form an output image,

20           said image processing output method comprising:

          a first step of dividing a number of pixels constituting the image into multiple pixel groups, where each pixel group consists of a preset number of plural pixels, and generating dot number data of each pixel group, which represents number of dots to be created in each pixel group, according to the image data;

          a second step of obtaining ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

          a third step of storing a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a

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pixel having the ordinal number;

a fourth step of referring to the correlation map to read a dot on-off state corresponding to the generated dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determining the dot on-off state in the pixel of the pixel group; and

a fifth step of actually creating dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

25. An image output method that receives image data after a preset series of image processing and creates dots on an output medium according to the received image data to form an output image,

said image output method comprising:

a step (A) of receiving dot number data of each pixel group, which represents number of pixels to be created in the pixel group, as the image data, where the pixel group is provided by collecting a preset number of plural pixels among a number of pixels constituting the image;

a step (B) of obtaining ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

a step (C) of storing a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

a step (D) of referring to the correlation map to read a dot on-off state corresponding to the received dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determining the dot on-off state in the pixel of the pixel group; and

a step (E) of actually creating dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

26. A program executed by a computer to actualize an image processing output method that makes image data subjected to a preset series of image

processing and creates dots on an output medium according to the processed image data to form an output image,

said program causing the computer to attain:

a first function of dividing a number of pixels constituting the image into multiple pixel groups, where each pixel group consists of a preset number of plural pixels, and generating dot number data of each pixel group, which represents number of dots to be created in each pixel group, according to the image data;

a second function of obtaining ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

a third function of storing a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

a fourth function of referring to the correlation map to read a dot on-off state corresponding to the generated dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determining the dot on-off state in the pixel of the pixel group; and

a fifth function of actually creating dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

27. A program executed by a computer to actualize an image output method that receives image data after a preset series of image processing and creates dots on an output medium according to the received image data to form an output image,

said program causing the computer to attain:

a function (A) of receiving dot number data of each pixel group, which represents number of pixels to be created in the pixel group, as the image data, where the pixel group is provided by collecting a preset number of plural pixels among a number of pixels constituting the image;

a function (B) of obtaining ordinal numbers of respective pixels included

in each pixel group as a priority order of dot creation in the pixel group;

a function (C) of storing a correlation map correlating each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number;

5 a function (D) of referring to the correlation map to read a dot on-off state corresponding to the received dot number data of each pixel group and the ordinal number of each pixel included in the pixel group and determining the dot on-off state in the pixel of the pixel group; and

a function (E) of actually creating dots on the output medium according to  
10 a determination result of the dot on-off state in the number of pixels.

28. An image output system comprising an image processing device that makes image data subjected to a preset series of image processing and an image output device that creates dots according to a result of the preset series of image  
15 processing to form an output image on an output medium,

said image processing device comprising:

a pixel group tone value specification module that specifies a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels  
20 constituting the image, according to image data of individual pixels in the pixel group; and

a dot number data supply module that refers to a first correlation map to generate dot number data of each pixel group and supplies the generated dot number data of each pixel group to said image output device, where the first  
25 correlation map correlates dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group,

said image output device comprising:

30 an ordinal number storage module that stores ordinal numbers of

respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

a dot on-off state determination module that receives the dot number data of each pixel group and refers to a second correlation map to determine a dot on-off state in each pixel included in the pixel group, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number; and

a dot creation module that actually creates dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

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29. An image output system in accordance with claim 28, wherein said image processing device further comprises a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the output image and allocates the pixel group classification number to each pixel group.

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30. An image processing system comprising a first image processing device that makes image data subjected to a preset series of image processing and a second image processing device that generates control data, which is used for controlling dot creation on an output medium to form an output image, according to a result of the preset series of image processing,

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said first image processing device comprising:

one value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to image data of individual pixels in the pixel group; and

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a dot number data supply module that refers to a first correlation map to generate dot number data of each pixel group and supplies the generated dot number data of each pixel group to said second image processing device, where the first correlation map correlates dot number data of each pixel group, which

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represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group,

said second image processing device comprising:

5 an ordinal number storage module that stores ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group; and

a control data generation module that receives the dot number data of each pixel group and refers to a second correlation map to determine a dot on-off state in each pixel included in the pixel group and thereby generate the control data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number.

15 31. An image processing system in accordance with claim 30, wherein said ordinal number storage module stores multiple different priority orders of dot-on pixels in one pixel group and stores ordinal numbers of respective pixels in each pixel group in relation to each of the multiple different priority orders, and

said control data generation module selects one priority order for each pixel group among the stored multiple different priority orders, and uses the ordinal numbers stored in relation to the selected priority order to determine a dot on-off state in each pixel included in the pixel group and generate the control data.

25 32. An image processing system in accordance with either one of claims 30 and 31, said first image processing device further comprises a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the output image and allocates the pixel group classification number to each pixel group.

33. An image processing system in accordance with claim 32, said classification number allocation module allocates the pixel group classification number to each pixel group, based on a relative position of the pixel group to a dither matrix, which includes multiple threshold values in a two-dimensional arrangement and is applied to the image,

said dot number data supply module generates the dot number data of each pixel group, which represents the number of dots to be created in the pixel group, by dither technique that applies the dither matrix to each pixel in the pixel group on the assumption that all the pixels in the pixel group have an identical pixel group tone value, and stores the generated dot number data in relation to a combination of the pixel group classification number and the pixel group tone value of the pixel group as the first correlation map,

said ordinal number storage module divides the dither matrix used for generation of the dot number data into multiple blocks corresponding to the multiple pixel groups, specifies an order of pixels in each pixel group based on a magnitude relation of threshold values in a block corresponding to the pixel group, and stores the specified order of pixels as one of the multiple different priority orders of dot-on pixels, and

said control data generation module selects one priority order corresponding to position of each pixel group on the image and determines the dot on-off state in each pixel included in the pixel group to generate the control data.

34. An image processing system in accordance with claim 33, wherein the dither matrix used in said classification number allocation module, said dot number data supply module, and said ordinal number storage module is a matrix having a blue noise mask characteristic.

35. An image processing system in accordance with claim 33, wherein the dither matrix used in said classification number allocation module, said dot number data supply module, and said ordinal number storage module is a matrix

having a green noise mask characteristic.

36. An image processing system in accordance with claim 32, wherein said classification number allocation module converts a resolution of the image data to  
5 make a pixel size identical with a size of each pixel group and allocates the pixel group classification number to each pixel with the converted resolution according to a relative position of the pixel in the output image, and

said pixel group tone value specification module specifies a tone value of the image data in each pixel with the converted resolution as the pixel group tone  
10 value of the pixel.

37. An image processing system in accordance with either one of claims 30 and 31, wherein said dot number data supply module stores a relation relating each combination of the pixel group classification number and the pixel group  
15 tone value to dot number data of each pixel group, which represents a combination of numbers of multiple different types of dots having different expressing tone values to be created in the pixel group, as the first correlation map, and

said control data generation module stores a relation relating each  
20 combination of an ordinal number and a value of the dot number data to a dot on-off state including a dot type to be created in a pixel having the ordinal number, as the second correlation map.

38. An image processing system in accordance with either one of claims 30  
25 and 31, wherein said pixel group tone value specification module specifies the pixel group tone value of each pixel group, which consists of 4 to 16 pixels in a preset positional relation.

39. An image output device that creates dots on an output medium  
30 according to image data to form an output image,

said image output device comprising:

a pixel group tone value specification module that specifies a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to image data of individual pixels in the pixel group;

a dot number data generation module that refers to a first correlation map to generate dot number data of each pixel group, where the first correlation map correlates dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

an ordinal number storage module that stores ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

a dot on-off state determination module that refers to a second correlation map to determine a dot on-off state in each pixel included in each pixel group with the generated dot number data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number; and

a dot creation module that actually creates dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

40. An image output device in accordance with claim 39, said image output device further comprising:

a classification number allocation module that classifies pixel groups into plural different classes according to positions of the respective pixel groups in the output image and allocates the pixel group classification number to each pixel group.

41. An image processing device that makes image data subjected to a preset series of image processing and generates the processed image data as control data, which is supplied to an image output device to control creation of dots and form an output image,

5       said image processing device comprising:

        a pixel group tone value specification module that specifies a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to image data of individual pixels in the pixel  
10       group;

        a dot number data generation module that refers to a first correlation map to generate dot number data of each pixel group, where the first correlation map correlates dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group  
15       classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

        an ordinal number storage module that stores ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group; and

20       a control data generation module that refers to a second correlation map to determine a dot on-off state in each pixel included in each pixel group with the generated dot number data and thereby generate the control data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal  
25       number.

42. An image processing device in accordance with claim 41, said image processing device further comprising:

        a classification number allocation module that classifies pixel groups into  
30       plural different classes according to positions of the respective pixel groups in the

output image and allocates the pixel group classification number to each pixel group.

43. An image output method that creates dots on an output medium  
5 according to image data to form an output image,

said image output method comprising:

a first step of specifying a pixel group tone value as a representative tone  
value of each pixel group, which is provided by collecting a preset number of  
plural pixels among a number of pixels constituting the image, according to  
10 image data of individual pixels in the pixel group;

a second step of referring to a first correlation map to generate dot  
number data of each pixel group, where the first correlation map correlates dot  
number data of each pixel group, which represents number of dots to be created  
in the pixel group, to each combination of a pixel group classification number  
15 allocated to the pixel group and the specified pixel group tone value of the pixel  
group;

a third step of storing ordinal numbers of respective pixels included in  
each pixel group as a priority order of dot creation in the pixel group;

a fourth step of referring to a second correlation map to determine a dot  
20 on-off state in each pixel included in each pixel group with the generated dot  
number data, where the second correlation map correlates each combination of an  
ordinal number and a value of the dot number data to a dot on-off state in a pixel  
having the ordinal number; and

a fifth step of actually creating dots on the output medium according to a  
25 determination result of the dot on-off state in the number of pixels.

44. An image processing method that makes image data subjected to a  
preset series of image processing and generates the processed image data as  
control data, which is supplied to an image output device to control creation of  
30 dots and form an output image,

said image processing method comprising:

a step (A) of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to  
5 image data of individual pixels in the pixel group;

a step (B) of referring to a first correlation map to generate dot number data of each pixel group, where the first correlation map correlates dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated  
10 to the pixel group and the specified pixel group tone value of the pixel group;

a step (C) of storing ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group; and

a step (D) of referring to a second correlation map to determine a dot on-off state in each pixel included in each pixel group with the generated dot  
15 number data and thereby generate the control data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number.

45. A program executed by a computer to actualize an image output  
20 method that creates dots on an output medium according to image data to form an output image,

said program causing the computer to attain:

a first function of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to  
25 image data of individual pixels in the pixel group;

a second function of referring to a first correlation map to generate dot number data of each pixel group, where the first correlation map correlates dot number data of each pixel group, which represents number of dots to be created  
30 in the pixel group, to each combination of a pixel group classification number

allocated to the pixel group and the specified pixel group tone value of the pixel group;

a third function of storing ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group;

5 a fourth function of referring to a second correlation map to determine a dot on-off state in each pixel included in each pixel group with the generated dot number data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number; and

10 a fifth function of actually creating dots on the output medium according to a determination result of the dot on-off state in the number of pixels.

46. A program executed by a computer to actualize an image processing method that makes image data subjected to a preset series of image processing and generates the processed image data as control data, which is supplied to an image output device to control creation of dots and form an output image,

said program causing the computer to attain:

15 a function (A) of specifying a pixel group tone value as a representative tone value of each pixel group, which is provided by collecting a preset number of plural pixels among a number of pixels constituting the image, according to image data of individual pixels in the pixel group;

20 a function (B) of referring to a first correlation map to generate dot number data of each pixel group, where the first correlation map correlates dot number data of each pixel group, which represents number of dots to be created in the pixel group, to each combination of a pixel group classification number allocated to the pixel group and the specified pixel group tone value of the pixel group;

25 a function (C) of storing ordinal numbers of respective pixels included in each pixel group as a priority order of dot creation in the pixel group; and

30 a function (D) of referring to a second correlation map to determine a dot



on-off state in each pixel included in each pixel group with the generated dot number data and thereby generate the control data, where the second correlation map correlates each combination of an ordinal number and a value of the dot number data to a dot on-off state in a pixel having the ordinal number.